

REMARKS

Applicants respectfully request entry of the foregoing and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow.

Claims 1-5 and 61 are pending in the application, new claim 61 having been added above.

By the above Amendments, Applicants have amended Claim 1 to further emphasize the polymer electrolyte's stability voltage and to address the claim objection and other minor informalities. Applicants also amended claim 2, 3 and 5 to address minor informalities. Finally, Applicants added new claim 61 to further define an exemplary embodiment. Support for new Claim 61 can be found at least at the Examples on pages 22 to 29 of the specification. A claim that has been amended in a manner that does not narrow the claim's scope should be accorded its full range of equivalents.

Applicants thank the Examiner for indicating that the drawings submitted on June 10, 2005, are accepted. Applicants also thank the Examiner for acknowledging Applicants' claim for foreign priority under 35 U.S.C. §119 and indicating that all certified copies of the priority documents have been received.

Turning now to the Official Action, claim 1 stands objected to for including various informalities. For at least the reasons that follow, withdrawal of the rejection is in order.

The Official Action objected to claim 1 for the recitation of "nano TiO₂ noncoated or coated with organic material... ." Applicants amended claim 1, in accordance with the Examiner's suggestion, to clarify the claim so that it reads, in part, "...nano TiO₂ noncoated; and nano TiO₂ coated with an organic material... ."

For at least these reasons, Applicants respectfully request reconsideration and withdrawal of the objection to claim 1.

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kono (U.S. Patent No. 6,399,254) or its equivalent or Ishiko (U.S. Patent No. 6,190,804) or its equivalent each in view of Ba Le (U.S. Patent No. 6,673,273) and/or Lan (U.S. Patent No. 6,596,803). For at least the reasons that follow, withdrawal of the rejection is in order.

Independent Claim 1 defines a polymer electrolyte for an electrochemical generator, wherein the polymer electrolyte comprises:

(a) at least one four-branched polymer having a hybrid termination, wherein at least one branch of said four branched polymer is capable of giving rise to cross-linking; with

(b) at least one component selected from the group consisting of SiO₂, Al₂O₃, nano TiO₂ noncoated, and nano TiO₂ coated with an organic material that is compatible with a tetrafunction terminal acryloyl-modified alkylene oxide polymer, the organic material being selected from at least one polyol or at least one polyethylene-polyoxyethylene copolymer or with an inorganic material selected from SiO₂ and Al₂O₃; and wherein the polymer electrolyte exhibits a stability voltage higher than 4 volts. (Emphasis added).

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claimed features. (See, In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).) In addition, "all

words in a claim must be considered in judging the patentability of that claim against the prior art." (See, In re Wilson, 424 F.2d 1382, 1385; 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). See also M.P.E.P § 2143.03.) Applicants submit that these requirements have not been met.

Kono relates to a solid electrolyte with ionic conductivity, which can be used in batteries, capacitors, electrochromic devices (ECD) sensors, etc. (See, Kono at col. 1, lines 9-11.)

Ishiko relates to a solid battery using a high-molecular weight solid electrolyte excellent in the ion conductivity. (See Ishiko at col. 1, lines 4-7.)

Ba Le relates to electrolyte compositions and electrochemical cells for use in alkali polymer batteries, particularly lithium polymer batteries. (See, Ba Le at col. 1, lines 5-8.)

Lan relates to polymer-clay nano composites comprising a matrix polymer and a layered clay material. The polymer-clay nano composites comprising a layered clay material may be processed under normal conditions while achieving low haze and improved oxygen barrier properties. Lan further relates to articles produced from the polymer-clay nano composites and processes relating to the nano composites. (See, Lan at col. 1, lines 10-19.)

First, neither Kono nor Ishiko discloses or fairly suggests all of the features defined in Claim 1. For example, Claim 1 specifically states that the claimed polymer electrolyte exhibits a stability voltage higher than 4 volts. In contrast, however, neither Kono nor Ishiko discloses or fairly suggests the claimed stability voltage. Moreover, the cited secondary references, Ba Le and Lan, do not overcome the deficiencies of the primary references Kono and Ishiko.

Accordingly, a *prima facie* case of obviousness cannot be made over the asserted combination of Kono or Ishiko in view of Ba Le and/or Lan because the asserted combination of references does not disclose or fairly suggest each feature of Claim 1 and does not reflect a proper consideration of all words in Claim 1 including, for example, "the polymer electrolyte exhibits a stability voltage higher than 4 volts." Applicants note that the Official Action is entirely silent about any of the cited references disclosing or even suggesting the claimed stability voltage.

The rejection under § 103(a) over the asserted combination of references is also improper because the Official Action does not provide evidence sufficient to indicate that one of ordinary skill in the art would have been motivated to modify and/or combine the reference teachings to arrive at the claimed polymer electrolyte. The requisite motivation for doing so must stem from some teaching, suggestion or inference in the prior art as a whole or from knowledge generally available to one of ordinary skill in the art and not from Applicants' disclosure. (See, *Ex parte Nesbit*, 26 U.S.P.Q.2d 1817, 1819 (B.P.A.I 1992); and *In re Oetiker*, 24 U.S.P.Q.2d 1443, 1446 (Fed. Cir. 1992).) The mere fact that the prior art can be modified does not make such a modification obvious unless the prior art or some other evidence suggests the desirability of the modification. (See, *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).)

Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected certain components for combination in the manner claimed. Moreover, the Patent Office must identify specifically the principle, known to one of ordinary skill in the art, that suggests the

claimed combination." (See, In re Lee, 277 F.3d 1338, 1343; 61 U.S.P.Q.2d 1430, 1434 (Fed. Cir. 2002).)

To avoid impermissible hindsight reconstruction of the prior art, it is necessary "to consider the thinking of one of ordinary skill in the art at the time of the invention and guided only by the prior art references and then-accepted wisdom in the field." (See, In re Kotzab, 217 F. 3d 1365, 1369; 55 U.S.P.Q. 2d 1313, 1316 (Fed. Cir. 2000).)

Here, Applicants find no such factors or motivation to combine Kono or Ishiko with Ba Le and/or Lan. In particular, the disclosure of both Kono and Ishiko indicate that the disclosed electrolytes already exhibit high mechanical strength and/or conductivity. (See, Kono, for example, art col. 17, lines 7-12 and Ishiko, for example, at col. 23, lines 60-63.) Thus, one of ordinary skill in the art reading the disclosures of Kono and Ishiko would have had no motivation to look to any other reference to provide information about ways to modify the disclosed electrolytes to provide adequate mechanical strength and/or conductivity. Furthermore, when considering the secondary references Ba Le and Lan, Applicants submit that there are various reasons why one of ordinary skill in the art would not have looked to these references even if one had been looking to modify the electrolytes of Kono and Ishiko. For example, Ba Le is substantially directed to the production of free-standing films, which are significantly different from the solid electrolyte compositions of Kono and Ishiko. In addition, Ba Le specifically discloses the use of various additives such as hydroxyl-functional particles that are particularly desired because they provide an interaction with the polymer, specifically cross-linking with polyisocyanates in the polymer. Again, such interaction or cross-linking with

polyisocyanates is something that while important for the compositions of Ba Le, is a factor that actually teaches away from combining Ba Le with Kono or Ishiko, which do not have polymers with polyisocyanates.

Furthermore, when considering the test data provided in the Tables of Ba Le, one can easily recognize that the data in Table 2 appears to indicate that when such additives are added to the electrolyte composition there is very little effect on conductivity. (See, Ba Le at Table 2, column 27, lines 35-45, which indicates that conductivity (S/cm) remained relatively constant at Alumina/Isocyanate % values between 0 and 15.) Thus, one looking to increase the conductivity of the compositions of Kono and Ishiko would not have been motivated to modify the electrolytes of primary references by incorporating additives that Ba Le discloses to have little or no effect on the conductivity, especially when the disclosed electrolyte compositions of the primary references already exhibit adequate mechanical strength and/or conductivity. Also relevant, is the fact that in Table 3, (column 27, lines 48 to 56) Ba Le appears to indicate that when an alumina additive was provided, a significantly greater variability was recognized in the measured float current (i.e., 2.37 ± 1.00 with no nanoparticles versus 1.32 ± 1.03 with 10% alumina). This increased current variability suggests that one of ordinary skill in the art would not have selected the additives of Ba Le (resulting in no appreciable increase in conductivity and increased current variability) to modify the electrolyte compositions of Kono and Ishiko, which were already disclosed to exhibit suitable mechanical strength and/or conductivity. Furthermore, Ba Le discloses polymer electrolytes that include numerous groups, namely, urethane groups, urea groups,

thiocarbamate groups, or combinations thereof, that are not present in the electrolyte compositions of Kono or Ishiko. (See, Ba Le, for example, at Abstract and Claim 1.)

With respect to Lan, Applicants submit that Lan is directed to polymer-clay nano composite materials comprising melt-processable matrix polymers and the layered clay material having a low quartz content, which Applicants find to be unrelated to the field of electrolyte compositions. That is, Lan appears to be substantially directed to an entirely unrelated, non-analogous technical field that no person of ordinary skill in the art would have reasonably looked to address issues with the strength and/or conductivity of electrolyte compositions like those disclosed in Kono or Ishiko. Thus, Applicants submit that it appears entirely improper to even consider Lan as a reasonable prior art reference to be combined with Kono or Ishiko. Indeed for purposes of evaluating the obviousness of claimed subject matter, one must make certain that a particular reference relied upon constitutes "analogous art." (See, for example, In re Clay, 966 F.2d 656, 658-59 (Fed. Cir. 1992).)

Accordingly, Applicants respectfully submit that the Official Action has ignored the varying teachings of the cited references and the failure of the references or any other evidence in the record to provide any suggestion that one should, or even could, select and combine specific features of the different references to arrive at the claimed polymer electrolyte having a stability voltage higher than 4 volts. Applicants submit that by proceeding in this manner, the Official Action has failed to consider the claimed subject matter as a whole, as required under 35 U.S.C. § 103(a). Applicants respectfully submit that there is no basis, absent the impermissible use of hindsight based on Applicants' disclosure, for combining the references in the manner suggested in the Official Action. The asserted combination of references is

improper because the references viewed by themselves, and not in retrospect, do not suggest the specific combination asserted by the Official Action. (See, In re Schaffer, 229 F.2d 476, 108 U.S.P.Q. 326 (C.C.P.A. 1956); and In re Stoll, 523 F.2d 1392, 187 U.S.P.Q. 481 (C.C.P.A. 1975).) The cited references provide no teaching or suggestion that would have motivated one to modify the disclosed electrolyte compositions and the Official Action provides no reference or any other evidence that would have led one of ordinary skill in the art at the time the claimed subject matter was developed to study the electrolyte compositions of Kono or Ishiko and modify them to include specific features of Ba Le and/or Lan. The Patent Office's burden of establishing a *prima facie* case of obviousness cannot be met unless there is some intrinsic basis in the cited prior art or some extrinsic factor that would have prompted one of ordinary skill in the art to make the asserted modifications and/or combinations of references.

In fact, Applicants submit that given the significant differences in the disclosed compositions and the fact that the compositions of the primary references were disclosed to already exhibit suitable properties, there would have been no motivation to look to the different components of Ba Le and/or Lan. That is, it appears to Applicants that the disclosure of Ba Le (that the additives therein do not lead to an improvement in conductivity and instead provide undesirable characteristics (current variability)) and the completely non-analogous disclosure of Lan, would have actually motivated one of ordinary skill not to combine the features of the cited references. That is, the cited references actually appear to teach away from making the asserted combination to arrive at the claimed polymer electrolyte. The only motivation for

ignoring these teachings is derived from the disclosure of the present application, which discloses the desirability of the recited combination of features.

Finally, Applicants submit that the § 103(a) rejection is also improper because the Official Action has not established that the prior art provides a reasonable expectation of success. See, M.P.E.P § 2143.02, which requires that the Patent Office provide evidence that there is a reasonable expectation of success to establish a *prima facie* case of obviousness. That is, beyond looking to the prior art to determine if it suggests doing what the inventors have done, one must also consider whether the prior art provides the required expectation of succeeding in that endeavor. (See, In re Dow Chem. Co. v. American Cyanamid, 837 F.2d at 473, 5 U.S.P.Q.2d at 1531 (both the suggestion and the expectation of success must be found in the prior art, not in Applicants' disclosure).) In the present case, however, the cited references provide neither a suggestion nor expectation of success in doing what the inventors have done (i.e., combining the recited features of Claim 1 to arrive at a polymer electrolyte exhibiting a stability voltage higher than 4 volts). The secondary references fail to overcome the deficiencies of Kono and Ishiko. One would not have expected to obtain the claimed electrolyte composition by combining selected features of Ba Le and/or Lan (which do not increase conductivity, provide increased current variability or are non-analogous) with Kono or Ishiko.

For at least the above reasons, Claim 1 is patentable over the asserted combination of Kono or Ishiko in view of Ba Le and/or Lan. The remaining claims depend, either directly or indirectly, from Claim 1 and are, therefore, also patentable over the asserted combination of references for at least the reasons that Claim 1 is patentable. Reconsideration and withdrawal of the § 103(a) rejection over the

combination of Kono or Ishiko in view of Ba Le and/or Lan are respectfully requested.

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kerr (U.S. Patent No. 7,101,643) in view of Ba Le and/or Lan.

Claim 1 is recited above.

Kerr relates to polymer electrolytes prepared by in situ cross-linking of allyl functional polymers based on hydrosilation reaction using a multifunctional silane cross-linker and an organoplatinum catalyst. The cross-linked electrolytes are insoluble in organic solvent and show much better mechanical strength. In addition, the processability of the polymer electrolyte is maintained since the casting is finished before gel formation. (See, Kerr at Abstract.)

Again, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all of the claimed features and "all words" in the claim must be considered in judging the patentability of that claim against the prior art. (See, In re Royka, In re Wilson and M.P.E.P § 2143.03.) Applicants submit that these requirements have not been met.

Kerr, like Kono and Ishiko, already discloses that the described polymer electrolytes exhibit suitable mechanical strength. (See Kerr, for example, at Abstract.) Thus, there would have been no reason to look to the teachings of Ba Le and/or Lan to address the mechanical strength of the polymer electrolytes of Kerr. Furthermore, as explained in detail above, Ba Le discloses that the described additives therein have no appreciable positive effect on conductivity and appear to lead to undesirable current variability. Also, it is clear to Applicants that the polymer electrolyte of Ba Le includes specific groups, namely, urethane groups, urea groups,

thiocarbamate groups, or combinations thereof. (See, Ba Le, for example, at Abstract and Claim 1.) However, these groups are not present in the electrolyte compositions of Kerr. Additionally, as explained above, Applicants believe that Lan (directed to polymer-clay nano composite materials) would not have been considered by any reasonable person of ordinary skill in the art because the subject matter of Lan is not analogous to the subject matter of Kerr (just as it is not analogous to the subject matter of Kono or Ishiko).

Also, a *prima facie* case of obviousness over Kerr in view of Ba Le and/or Lan cannot be established because the asserted combination of references does not disclose or fairly suggest each element of Claim 1 including, for example, the recitation that the claimed polymer electrolyte exhibits a stability voltage higher than 4 volts. Thus, the asserted combination also cannot be relied upon because it does not reflect a proper consideration of all words in Claim 1.

Also, for the reasons discussed above, the § 103(a) rejection over Kerr in view of Ba Le and/or Lan should be withdrawn because the Official Action fails to provide sufficient evidence of motivation to modify and/or combine the reference teachings to arrive at the claimed electrolyte composition. Again, the requisite motivation for doing so must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from Applicants' disclosure. Here, Applicants again find no factors or motivation to combine Kerr with Ba Le and/or Lan and that to make such a combination ignores the varying fields of the cited references and the fact that neither the references themselves nor any other evidence in the record provide any suggestion that one should, or even could, select and combine specific features of

the references to arrive at the claimed polymer electrolyte. That is, Applicants respectfully submit that there is no basis, absent the impermissible use of hindsight based on Applicants' disclosure, for combining Kerr with specific teachings of Ba Le and/or Lan, as suggested in the Official Action.

Moreover, the Official Action has not properly established that the prior art provides a reasonable expectation of success in doing what the inventors have done (i.e., combining the features defined in Claim 1 to arrive at a polymer electrolyte that exhibits a stability voltage higher than 4 volts).

For at least the above reasons, Claim 1 is patentable over the asserted combination of Kerr in view of Ba Le and/or Lan. The remaining claims depend, either directly or indirectly, from Claim 1 and are, therefore, also patentable over the asserted combination of references for at least the reasons that Claim 1 is patentable. Reconsideration and withdrawal of the § 103(a) rejection over the combination of Kerr, Ba Le and Lan are respectfully requested.

Finally, Claim 5 stands rejected under 35 U.S.C. § 103(a) as being obvious over Kerr in view of Ba Le and/or Lan and further in view of Kono or Ishiko. For at least the reasons that follow, withdrawal of the rejection is in order.

Claim 1 is recited above.

Applicants have also described Kerr, Ba Le, Lan, Kono and Ishiko above.

For all of the reasons explained in detail above, the § 103 rejection over Kerr in view of Ba Le and/or Lan and further in view of Kono or Ishiko is improper and should be withdrawn. Specifically, as explained above, the asserted combination of references does not disclose or fairly suggest all of the features in Claim 1 and does not reflect proper consideration of all the words in Claim 1. For example, none of the

references, alone or in combination, discloses or fairly suggests a polymer electrolyte comprising at least one four-branch polymer and at least one component selected from the group consisting of SiO_2 , Al_2O_3 , nano TiO_2 non-coated and nano TiO_2 coated with specified organic materials, which exhibits a stability voltage higher than 4 volts.

Furthermore, each of the references Kerr, Kono and Ishiko disclose electrolyte compositions that are described to already exhibit suitable properties (i.e., conductivity and/or mechanical strength.) Thus, the purported motivation provided in the Official Action for looking to Ba Le and/or Lan does not exist. Moreover, the secondary references would not have been considered to by one of ordinary skill in the art for combination with the primary references. For example, Ba Le discloses additives to be used only with polymers including specific groups that are not present in the polymer electrolyte compositions of Kerr, Kono or Ishiko; that provide no appreciable positive effect on conductivity; and, instead appear to provide negative effects on other properties (current variability). Furthermore, the disclosure of Lan is unrelated to the field of electrolytes and would not have been considered by persons of ordinary skill in the art looking to modify the strength and/or conductivity of the compositions of Kerr, Ishiko and/or Kono. Finally, as indicated above, the Official Action provides no evidence to support a reasonable expectation of success in combining specific teachings from these different references to arrive at the claimed polymer electrolyte.

For at least these reasons Claim 1 is patentable over the combination of Kerr in view of Ba Le and/or Lan and further in view of Kono or Ishiko. Claim 5, which depends on Claim 1, necessarily includes all the features of Claim 1. Accordingly,

Claim 5 is also patentable over the asserted combination of references for at least the reasons that Claim 1 is patentable. Reconsideration and withdrawal of the rejection of Claim 5 over Kerr in view of Ba Le and/or Lan and further in view of Kono or Ishiko are respectfully requested.

From the foregoing, Applicants earnestly solicit further and favorable action in the form of a Notice of Allowance.

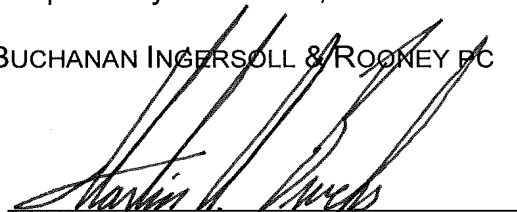
If there are any questions concerning this paper or the application in general, Applicants invite the Examiner to telephone the undersigned at the Examiner's earliest convenience.

Respectfully submitted,

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Date: November 12, 2009

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